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EVALUATION OF SURVEY PROCEDURES FOR DETERMINING OCCUPANT LOAD FACTORS IN CONTEMPORARY OFFICE BUILDINGS

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ABSTRACT

The development of survey methods for determining the occupant load in office buildings (business occupancies) is described. Considerations involved in formulating the survey methods are presented. The type of data to be collected and data collection techniques are discussed. The two survey methods utilized to collect the population counts within contemporary office buildings are a building walk-through and a telephone survey.

Occupant load data obtained from the survey methods applied in 23 office buildings located in the Washington, DC area are presented. Data are presented on the magnitude and distribution of the loads. The building data is sorted according to the following groups: open plan office designs versus well-compartmented office designs, and government (federal and county) versus private sector tenants. Statistical summaries of the data are presented.

Buildings that are primarily composed of open plan office designs are found to have greater occupant load factors than buildings composed of well-compartmented office designs. County government office buildings are found to be slightly greater occupant load factors than federal government buildings. Federal government buildings have lesser occupant load factors than private office buildings. The mean occupant load factor found in the study for all buildings is 248 ft^2/person.

The telephone survey technique yielded a slightly greater occupant load factor than did the building walk-through technique. However, because the two survey approaches yielded relatively similar results, both are considered to be acceptable in assessing office building occupant loads. The telephone survey requires substantially less time and effort to complete, but is dependent on building management's knowledge of the occupancy characteristics. The walk-through approach required reviewing building drawings and an on-site walk-through of the building.

I. BACKGROUND

1.1 Definition of Occupant Load Factor

In engineering, the design of any system is a function of the anticipated loads or demands. As related to fire safety aspects in the design of buildings, the anticipated demands include the number of building occupants in the space, where the number of building occupants serves as the "load" for the means of egress system.

The perspective taken to estimate the number of building occupants, *i.e.* occupant load, is to estimate the number of people expected to occupy a space. Consequently, use of the word *expected* implies *average*. The occupant load can be estimated by the ratio of the floor area to the average area occupied by each person. The average area occupied by each person is referred to as the *occupant load factor* in the *Life Safety Code* [1]. The occupant load factors cited in the *Life Safety Code* are a function of the use and area of that space.

Occupant load factors first appeared in the Building Exits Code in the 3rd edition of the code published in 1934 [2,3]. The occupant load factor of 100 ft^2/person was specified for office, factory and workrooms. The occupant load factors for other occupancies included 40 ft^2/person for schools and courtrooms, 125 ft^2/person for hotels and apartments, 150 ft^2/person for institutional facilities, and 15 ft^2/person for dance halls and places of assembly. All occupant load factors were based on the gross floor area of the building, such that no deduction was permitted for corridors, closets, restrooms or other subdivisions.

The introduction of occupant load factors in 1934 was part of a major change in the method of assessment of egress design, omitting the complicated formulae and tables in the earlier editions of the Building Exits Code. Acceptance of the approximate method of analysis in the code using the average occupant load factor for an occupancy appears to attributable to its relative simplicity. However, there is no formal record indicating the basis of the occupant load factors included in the 1934 Building Exits Code. The coincidence of an NBS study published at approximately the same time (one year later in 1935) [4] leads to the conjecture that the results from the NBS study, despite being unpublished in 1934, were the most likely basis of the occupant load factors adopted into the Code [5].

In the current edition of the *Life Safety Code*, the occupant load factor for office buildings is still 100 ft^2/per person, based on gross floor area [1]. In the *Life Safety Code*, the "gross floor area is defined as the area within the inside perimeter of the outside walls of the building under consideration with no deduction for hallways, stairs, closets, thickness of interior walls, columns, or other features" [1, section 3-2].

Changes in office building design have raised concerns about the accuracy of the occupant load factor cited in the *Life Safety Code* for contemporary business occupancies. Contemporary office building designs often incorporate open plan office designs instead of the traditional well-compartmented type designs. The open plan office is composed of open areas that may or may

not be partitioned. The *Life Safety Code* states, "An example of an open plan building is one in which the work spaces and accesses to exits are delineated by the use of tables, desks, bookcases, counters, or by partitions that are less than floor to ceiling height." [1, section A-26-3.6.1]

Offices in well-compartmented buildings are usually occupied by one or two people and contain walls which extend from floor to ceiling. Typically, the offices have one entrance. Inherent in office buildings following the open-plan design, less space is occupied by the thin interior partitions. Consequently, the occupant load factor may increase, if still based on gross floor area. In addition, changes in the American workplace, such as the use of workstations, may also have an effect on the occupant load factor.

This study was initiated to investigate the adequacy of survey methods to determine the occupant load factor for contemporary business occupancies. In this study, telephone surveys and facility walk-through surveys are utilized to obtain data necessary for establishing occupant load factors, though other methods are considered and addressed. In addition, this study provides insight into the impact of open plan office designs on the occupant load factor.

1.2 Previous Studies

Previously, numerous studies have been conducted to determine the occupant load factors for various occupancies. The studies utilized a variety of data collection methods. After the initial study in 1935, all of the subsequent studies have concluded that the 100 ft^2/person occupant load factor noted in the *Life Safety Code* for office occupancies is conservative [2]. An excessively conservative occupant load factor may impact the cost of building construction, by requiring office buildings to have additional egress capacity and number of exits to accommodate the "over-estimated" population.

The first study was conducted in 1934 by John H. Courtney and Harry B. Houghton, associate engineers at the National Bureau of Standards, and George N. Thompson, secretary of the Building Code Committee [3]. The study involved analyzing the design and construction of building exits in buildings of various occupancy types. The study investigated buildings located in Atlanta, GA, Greenville, SC, Greensboro, NC, Roanoke, VA, Washington, DC, Frederick and Baltimore, MD, and Pittsburgh, PA [4].

A total of 22 office buildings were surveyed by Courtney, *et al.* The characteristics of the 13 buildings surveyed which included information on the occupant loads are noted in Table 1. The population on *typical floors* for the office buildings was determined by actual counts of building occupants. In their study, building walk-throughs were conducted to count the number of building occupants in factories and schools, in addition to the offices. In hotels an estimate of the population on a typical floor was made by counting the number of beds and assuming all rooms to be occupied. The number of seats was noted in theaters, with the assumption that all of the seats were taken. In other occupancies, estimates from those in charge of the building were accepted. For example, in apartment buildings the resident manager was asked to provide

information on the occupant load, assuming that the resident manager had an accurate knowledge of the number of people occupying any floor.

Table 1. Office Building Measurements by Courtney, *et al.*

Building Number	Number of Stories	Floor #	Floor Area (ft^2)	Population on Typical Floor	Gross Area (ft^2/person)
3	33	31-33 23-30 18-22 3-17 1-2	2,500 3,800 6,460 17,700 21,600	142	120
4	21	all	6,900	52	132
5	20	all	8,800	64	137
6	19	all	7,200	100	72
7	17	all	20,000	300	66
9	12	all	6,960	46	151
10	12	all	6,300	92	68
11	11	all	4,850	48	100
12	11	all	8,000	100	80
13	10	all	4,000	25	160
14	9	all	4,700	50	94
17	2	all	8,000	60	133
18	2	all	9,500	70	135
Total			1,594,370	18,302	87.1

In Table 1, the average occupant load factor for the 13 buildings surveyed by Courtney, *et al*, ranges from 66 to 160 ft^2/person, with an average of 87.2 ft^2/person (gross area). Though unstated, it is likely that most of the offices included in the survey were well-compartmented, as open-plan offices were rarely found in the 1930's.

The next study was conducted approximately 30 years later by the Building Owners and Managers Association (BOMA) [5,6] as part of a national survey distributed to building managers. This survey, repeated annually since 1966, receives responses from approximately 1,000 building managers. The office building occupant load factors (reported as *occupant densities*) are published annually in the BOMA "Experience Exchange Reports" [6]. In 1966, BOMA reported the occupant load factor to be 160 ft^2/person (gross). The occupant load factors reported by BOMA from 1966 to 1990 are presented in Figure 1. A relatively steady increase is noted from 1966 to 1986, with a relatively stable occupant load factor being reported in 1986 to 1990. In 1990, building occupant densities again increased, with the occupant load factor reported to be 275 ft^2/person (gross). [5,6].

In 1969, Nelson investigated the space utilization in federal government office buildings [7]. He collected space planning data federal office buildings located in Philadelphia, PA and Washington, DC. Nelson determined that the occupant load in these federal office buildings was approximately 150 ft^2/person (gross).

In 1977, Johnson and Pauls determined the occupant load factor to be 278 ft^2/person (gross) [8]. The number of occupants was determined from videotape records of evacuation drills in Canadian office buildings. In eighteen evacuation drills, there was only a total of 10,281 evacuees. However, based on the occupant load factor noted in the *Life Safety Code* [8], a total of 27,650 evacuees were expected. Similarly, videotape records during a three-day period of the use of an entrance to a 21-story office building by building occupants were used to determine that the maximum occupancy at any time during the three-day period was 1400 persons. An estimate of the occupant load for that building using the occupant load factor cited in the *Life Safety Code* is 3400 persons [8]. The resulting occupant load factor for the building based on the videotape records was determined to be 243 ft^2/person (gross) [8].

In another study conducted by Cormier, De Wolf, Henning, and Schneider for Public Works Canada (1977), the area of a typical office workstation was determined to be 175 to 185 ft^2. By converting the usable floor area to gross floor area, utilizing a conversion factor of 1.25 as proposed by Cormier, *et al.*, the associated occupant load factor ranged from 220 to 230 ft^2/person (gross) [9].

Bourdeau conducted the most recent occupant load study in 1992, which consisted of walk-through surveys of buildings at the College Park Campus of the University of Maryland. Bourdeau surveyed occupants on 18 floor levels in eight different office buildings. The occupant load factors ranged from 175 to 200 ft^2/person (gross).

The results of the original 1935 NBS study and the five most recent studies conducted between 1966 and 1992, are summarized in Table 2. The occupant load factor determined from the five recent surveys in business occupancies ranges from 150 to 278 ft^2/person. This compares to the occupant load factor included in the *Life Safety Code* of 100 ft^2/person and 87.2 ft^2/person reported in the NBS study.

Table 2. Summary of Previous Occupant Load Surveys

Survey Team	Occupant Load Factor (ft^2/person)(gross)
NBS	87
Nelson	150
BOMA	160-275
Johnson and Pauls	243-278
Cormier, et al.	220-230
Bourdeau	175-200

II. STUDY PROCEDURE

This study utilized two different procedures to obtain the data- a walk-through survey and a telephone survey. The data to be acquired from either survey method included:

- gross floor area of building
- number of occupant in building
- design of office space, being either well-compartmented or open-plan, whichever is most prevalent in the building
- tenant characteristics, either federal or county government, or private sector

A literature survey was conducted to review the survey procedure and data collection forms used by Bourdeau in 1992 [5]. This review resulted in the development of a preliminary data collection procedure and survey form for trial use. This form was used to conduct an occupant load survey in the office space occupied by the National Capital Region of the U.S. General Services Administration located in Washington, DC. Following a review of the initial effort, the data collection procedure and form was amended. The amended form is presented as Figure 2.

A second survey, utilizing the amended form, was conducted on Friday January 13, 1995 of the third and fourth floors of the Headquarters Building of the U.S. General Services Administration in Washington, DC. A walk-through type survey attempted to account for all occupants on the two selected floors. Several challenges were identified which required resolution in order to accurately determine the occupant load. Many of the challenges relate to the movement of building occupants during the time period required to complete the survey. The principle challenges associated with the building walk-through method were:

1. Only about one-third of the workforce was present during the time required to complete the walk-through survey. This was attributed to the following two factors.

    - In many government buildings a reduced workforce is present on Mondays and Fridays due to flexible work schedules.

- The particular Friday of the building survey was prior to a three-day weekend (the following Monday was a Federal holiday), possibly compounding the reduced workforce problem.

2. More than one person may be present at a particular workstation or office. The "extra person" may be a visitor or may be a co-worker who has left their workstation temporarily. This co-worker may be counted twice if they return to their workstation by the time a member of the survey team reaches the co-worker's workstation. Because the survey team wanted to minimize the interruption of meetings and conversations, the extra person was often counted, unless the opportunity arose to ask a quick question concerning the extra person.

3. Workstations or offices may be vacant, either because an individual is not "at work" on the day of the survey, or is located elsewhere in the building.

4. Often building maintenance and custodial staff or construction workers are readily identified by their different working attire and can be distinguished from most office workers and visitors. However, these individuals typically move continuously throughout the building, perhaps being missed or counted more than once.

5. Spaces behind locked doors pose several problems. Occupants may be in these spaces and thus will not be included. Alternatively, some spaces should be excluded from the survey if classified as another occupancy or under renovation (as was the case in one building survey).

6. Occupants walking in corridors or located in rest rooms, lobbies, supply rooms, etc. are difficult to account for, without also possibly being included at their respective workstation.

The project team reviewed and discussed possible alternative survey procedures which could be applied to obtain the necessary data. The feasibility of each alternative procedure was assessed based on the following considerations:

- How well did the procedure address the listed challenges discovered during the initial survey?
- How time consuming was the procedure?
- What resources did the procedure require?
- Were the required resources available?

An adaptation of the procedure utilized by Johnson and Pauls' study of 1977 consisting of videotaping the flow of building occupants into or from a building was debated as a means of providing insight to the occupant load of the building. Providing videotape cameras or manual counters at each building entrance was proposed, though later dismissed because many office buildings included in the survey have numerous entrances. Another drawback of the method results from individuals who enter, leave and re-enter the building during the survey period. In addition, this procedure would not provide any insight into the distribution of occupants within the building, which is especially relevant in multi-use buildings where building occupants may

proceed to a building area other than that devoted for office use. The method does not account for any employees out of the office on sick leave, vacation, or traveling.

Allowing facilities management to provide the required parameters, through telephone surveys, is feasible but also has limitations. The data held by facilities management usually accounts for only company employees and does not include any visitors, construction personnel, custodial and maintenance personnel and perhaps other personnel in the office temporarily. The method does not account for any employees out of the office on sick leave, vacation, or traveling. The areas referenced by facilities management may be based on "net area".

Despite the limitations and challenges associated with the walk-through method, similar to the one used by Bourdeau, this method is the preferred method adopted for data collection, considering the advantages and limitations of the other methods. Telephone surveys are used in the remaining buildings. Conducting surveys during times when a reduced workforce is expected as a result of flexible work schedules or holidays can be avoided. Polite interruptions can be used to correctly identify and account for multiple occupants found in a single workstation or occupants found in break areas, restrooms, or corridors. Vacated workstations are accounted for by discussing their occupancy with other workers in the area. If the discussions are too frequent or disruptive of normal business operations, then the surveyor exercises judgment. Individuals are counted at workstations that appear occupied, even though they are absent at the time the surveyor reaches that location if either personal belongings are present, *e.g.* pictures, purses, coats, or if an operating computer unit is present. Name plates at office entrances can be referenced to make judgments on the presence of occupants. Maintenance and custodial people are included and easily distinguished because of their working attire. Areas that are not accessible because of locked doors or restrictions are excluded from the survey, with the area of the section subtracted from the gross floor area.

Gross floor areas are obtained through discussion with facilities management, direct measurement or calculated from available blueprints. The type of office space, open or compartment, is observed and verified by facilities management. The building ownership or leasing information was provided by facilities management.

For the purpose of this survey, rooms or areas are classified as a business or office occupancy based on the following guidelines from the *Life Safety Code* [1].

1. All assembly areas except library stack areas are classified based on "net" area.

2. Areas are labeled as assembly only if at least 50 people are expected, otherwise they are classified by the predominant occupancy. Considering the occupant load factor typically assumed for auditoriums, club rooms and conference rooms, these spaces are classified as an assembly use, only if their area is greater than 350 ft^2. Similarly, restaurants and theaters must have an area of at least than 750 ft^2 Libraries must have an area of greater than 5,000 ft^2 and reading rooms must be greater than 2,500 ft^2.

3. A minor merchandising operation such as a newsstand is ignored, with the space associated with the dominant occupancy.

III. DATA

A total of 35 office building representatives were asked to participate in this study, either by permitting a walk-through of the building or assisting with the telephone survey. Sixteen of the 35 representatives chose to participate in the study, resulting in a survey sample size of 23 buildings. Ten buildings were surveyed utilizing the telephone survey while 55 floors in nine buildings were surveyed utilizing the walk-through method. A total floor area of 3,608,899 ft^2 and 14,549 occupants compose the data utilized in this study.

The walk-through surveys were conducted in the following buildings:

- NASA Goddard, Greenbelt, MD--buildings 2, 18, 21, 22, 23
- General Services Administration Headquarters, Washington, DC
- Marriott Headquarters, Bethesda, MD
- Prince George County Administration Building, Upper Marlboro, MD
- Prince George County Largo Center, Largo, MD
- Switzer Building, Washington, DC
- US Department of Housing and Urban Development(HUD), Washington, DC
- Brunswick Building, Fairfax, VA
- Culpepper Building, Fairfax, VA

Telephone surveys were conducted for determining the occupant load factor in the following buildings:

- FBI Building S-5, Woodlawn, MD
- Liberty Loan Building, Washington, DC
- Portsmouth Federal Building, Portsmouth, VA
- Blue Ridge Office Center, Manassas, VA
- SEABAT Building, Suffolk, VA
- GEICO Insurance Corporation, Fredericksburg, MD
- Verlan Fire Insurance, Silver Spring, MD
- Schirmer Engineering Corporation, Falls Church, VA
- Hardwick Building, College Park, MD
- Cohen Building, Washington, DC

Table 3 presents the number of occupants and gross floor area identified for each floor, building and site surveyed. Each office and building are classified by type and category. Data from the

Table 3. Summary of Data

Sample #	Building #	Floor #	Design	Tenant	Survey Method	Gross Area (ft^2)	Number of Occupants	Occupant Load Factor (ft^2/person)
1	1	Ground	C	FG	W	14,674	69	213
2		1				16,153	102	158
3		2				16,250	85	191
		Total				47,077	256	184
4	2	1	C	FG	W	12,591	75	168
5		2				5,567	33	169
		Total				18,158	108	168
6	3	Ground	C	FG	W	15,935	94	170
7		1				16,270	79	206
8		2				16,727	96	174
		Total				48,932	269	182
9	4	Ground	C	FG	W	28,858	155	186
10		1				24,147	137	176
11		2				20,870	121	172
12		3				22,350	139	161
		Total				96,225	552	174
13	5	1	C	FG	W	12,361	82	151
14		2				24,718	142	174
15		3				12,878	64	201
16		4				12,878	92	140
		Total				62,835	380	165
17	6	2	O	FG	W	74,804	251	298
18		3				74,877	243	308
19		4				74,787	250	299
20		5				74,743	259	289
		Total				299,211	1,003	298
21	7	Total	C	FG	T	42,667	200	213
22	8	Total	C	FG	T	170,000	450	378
23	9	Total	C	FG	T	72,000	375	192
24	10	Total	O	FG	T	47,000	220	214
25	11	2	O	P	W	121,240	591	205
26		Total			T	866,000	3,840	226
27	12	1	O	CG	W	30,000	121	248
28		2				30,744	110	279
29		3				30,744	113	272
30		4				30,744	116	265
31		5				30,744	100	307
		Total				152,976	560	273
32	13	1	O	CG	W	15,464	55	281
33		4				17,205	75	229
		Total				32,669	130	251
34	14	Total	C	FG	T	200,000	540	370

Table 3. Continued

Sample #	Building #	Floor #	Design	Tenant	Survey Method	Gross Area (ft^2)	Number of Occupants	Occupant Load Factor (ft^2/person)
35	15	Total	O	P	T	350,000	1,500	233
36	16	Total	C	P	T	4,000	12	333
37	17	Total	C	P	T	2,800	12	233
38	18	Total	C	P	T	50,000	186	269
39	19	Total	O	FG	W	405,765	1,543	263
40	20	Total	C	FG	T	330,000	1,346	245
41	21	1	C	FG	W	64,428	226	285
42		2				64,428	209	308
43		3				64,428	224	288
		Total				193,284	659	293
44	22	1	O	P	W	11,600	39	297
45		2				7,600	19	400
46		3				11,600	47	247
47		4				10,200	27	378
48		5				11,600	43	270
49		6				10,900	36	303
		Total				63,500	211	301
50	23	1	O	P	W	11,700	35	334
51		2				11,700	28	418
52		3				11,700	50	234
53		4				5,900	32	184
54		5				5,900	27	219
55		6				5,900	25	236
		Total				52,800	197	268

walk-through surveys is presented on a floor-by-floor basis. In contrast, the data from the telephone surveys is presented on a building basis because total occupant loads were reported for the entire building by building managers contacted. Occupant load factors are calculated for each floor, building and site.

IV. ANALYSIS

Table 4 presents a summary of the data of the occupant load factors for the different building types, e.g. open plan versus well-compartmented designs and federal and county government versus private tenants. The number of samples refers to the number of floor levels for the walk-through surveys or the number of buildings from the telephone surveys.

Table 4. Summary of Occupant Load Factors

Parameter	# of Samples	Mean	Standard Deviation	95% Confidence Interval
Well-compartmented	27	219	66.2	194-244
Open-plan	28	276	55.5	
Government	37	234	62.2	214-254
Private sector	18	279	67.0	
Walk-through	44	244	67.8	224-264
Telephone	11	264	62.5	

The mean occupant load considering all of the observations is 248 ft^2/person (gross), with a standard deviation of 67.3 ft^2/person. Data from all of the observations are summarized in Figure 3. The range of all of the observations is 140 to 418 ft^2/person. The 95% confidence interval for the occupant load factor for the entire sample is 230 to 266 ft^2/person. Consequently, the occupant load factor of 100 ft^2/person cited in the *Life Safety Code* is appreciably outside of this confidence interval.

The occupant load factor for buildings that contain primarily well-compartmented type office space have lesser occupant load factors than the open-plan office designs. Figure 4 illustrates the comparison of the occupant load factors between the two office designs. Further, the mean for the open-plan office designs is outside of the 95% confidence interval for the well-compartmented office designs indicating a statistically significant difference between the designs.

Privately owned or leased office buildings are less densely occupied than are government office buildings. Further, the difference in the occupant load factors for offices spaces with government versus private sector tenants is statistically significant at the 95% confidence interval. Differences in the occupant load factors for the two sets of tenants are presented in Figure 5.

Further analysis of the occupant load factors for government and private sector tenants and design of office space are included in Table 5. Even though only three samples of the well-compartmented design with a private sector tenant are included in the survey, the mean occupant load factor for the private sector tenant is virtually the same for both the well-compartmented and open plan designs. Conversely, the differences noted for the designs of offices with government tenants are statistically significant.

Comparing the results from the two survey procedures, the occupant load factors determined from the telephone survey procedure are slightly greater than those determined from the walk-through procedure. The comparison is illustrated in Figure 6. There are 11 observations obtained from the telephone survey procedure with a mean occupant load factor of 264

ft^2/person. There are 44 samples from building walk-through procedure with a mean occupant load factor of 244 ft^2/person. As indicated in Table 4, the differences are statistically insignificant.

Table 5. Comparison of Occupant Load Factors

Tenant	Design	# Samples	Mean	Standard Deviation	95% Confidence Interval
Government	Well-compartmented	24	212	65.0	
	Open-plan	13	273	28.1	
	Total	37	234	62.2	214-254
Private	Well-compartmented	3	278	41.4	
	Open-plan	15	287	71.0	
	Total	18	279	67.0	246-310

V. SUMMARY

A telephone survey and a building walk through survey procedure has been formulated to obtain occupant load factors of contemporary office buildings. Both of the survey methods used, as well as others considered, have drawbacks which are not easily overcome without providing an inconvenience or disruption to office workers. Studies conducted since 1966 have disputed the occupant load factor cited in the *Life Safety Code* for office buildings.

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Figure 1. Occupant Load Factors from BOMA Surveys

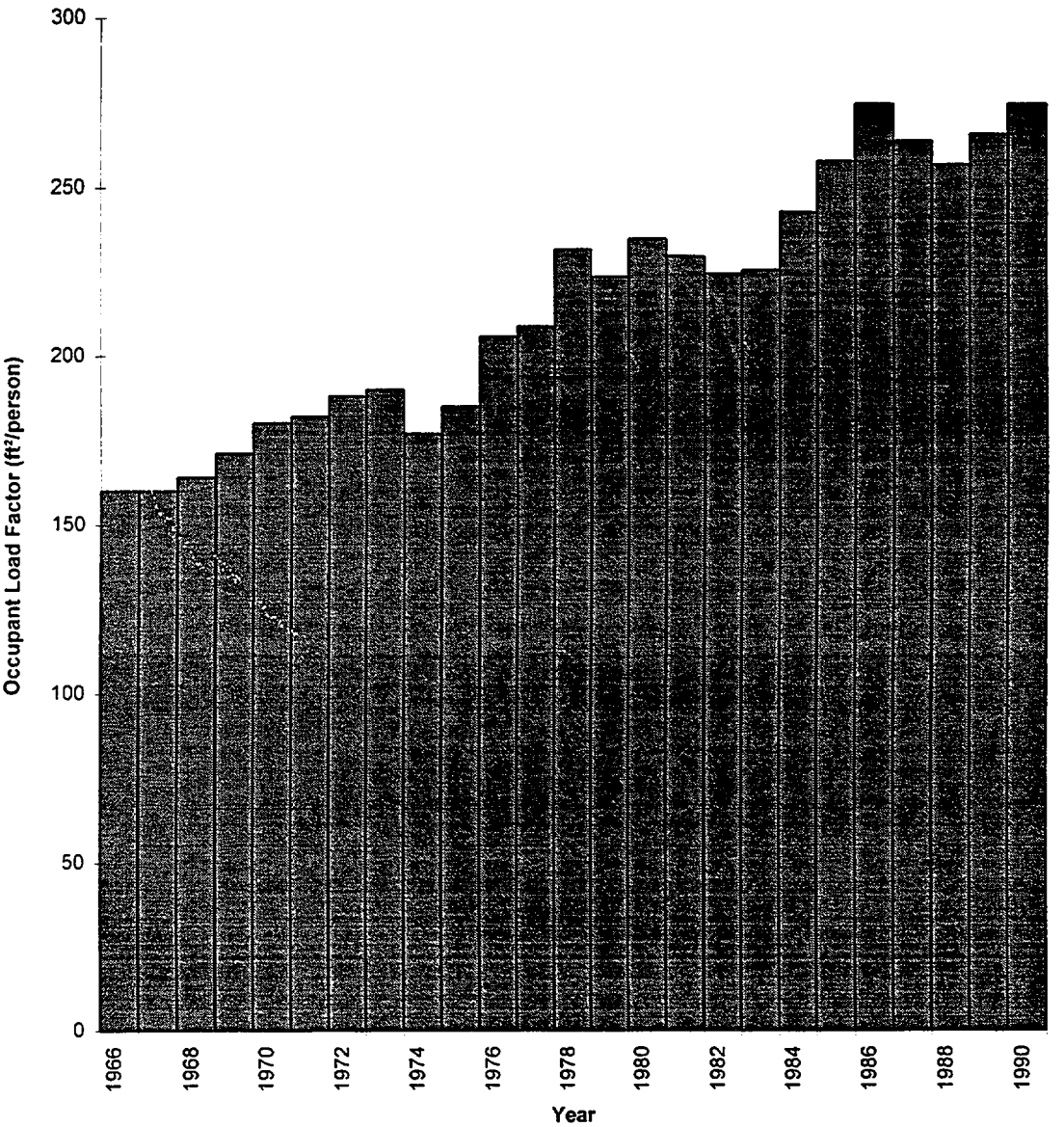


Figure 2. Occupant Load Survey Form

Building _____ Date _____
Floor _____ Time _____
Surveyor _____

Room #	Area	Present	Apparent	Reference	C/O.P.	Comments

Figure 3. Summary of Occupant Load Factors from Survey

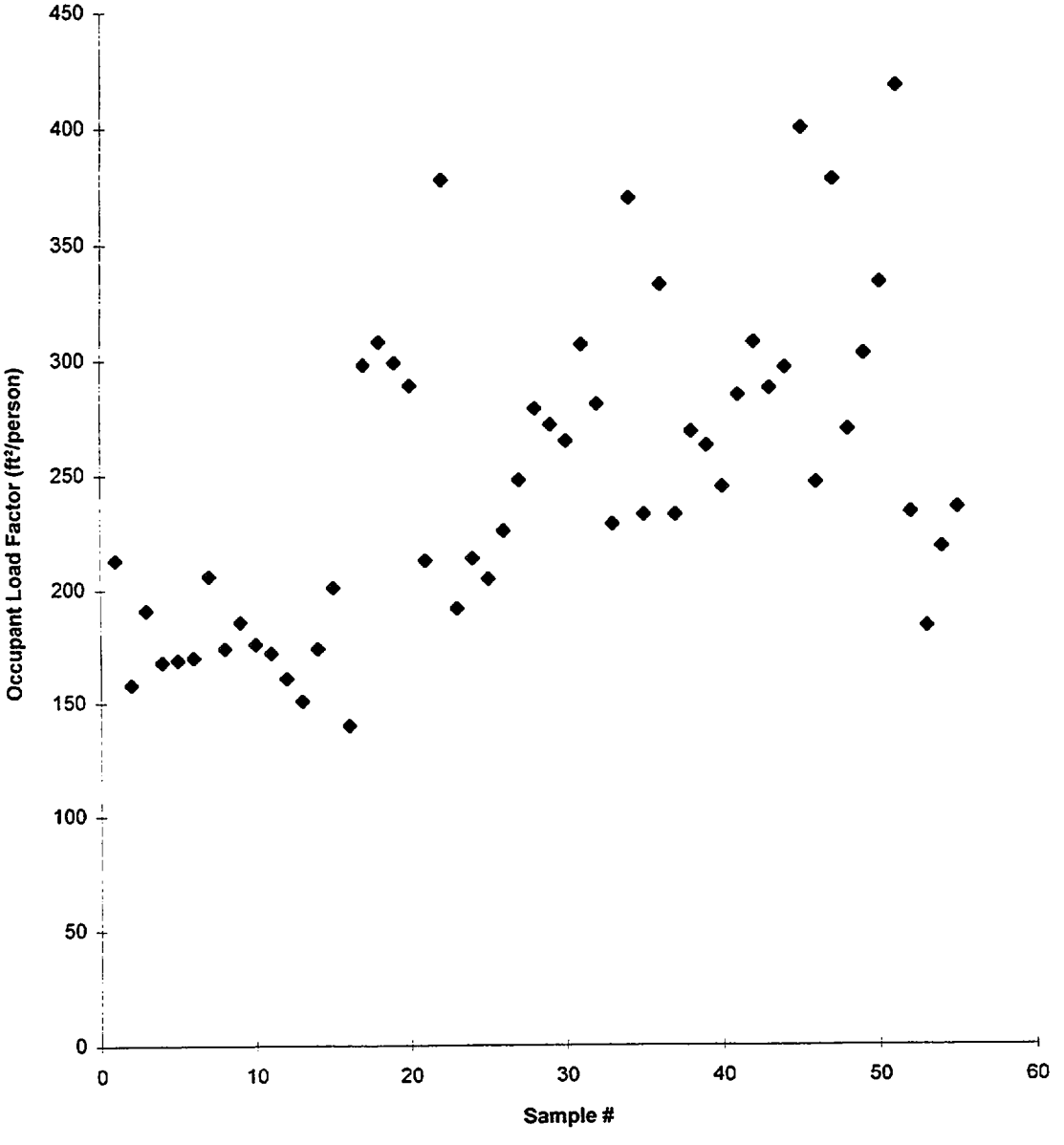


Figure 4. Comparison of Occupant Load Factors for Well-Compartmented and Open Plan Offices

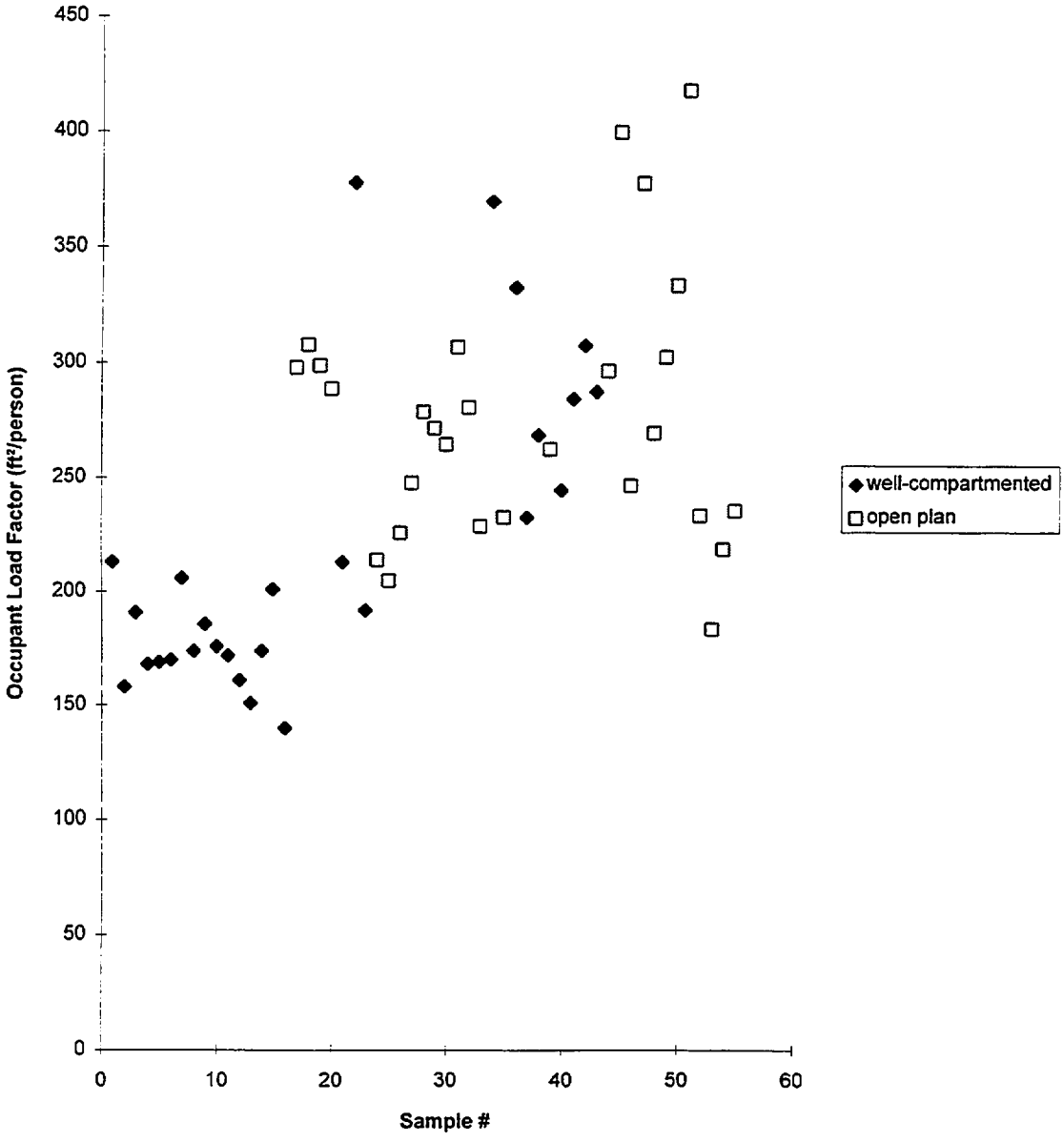


Figure 5. Comparison of Occupant Load Factors for Government and Private Sector Offices

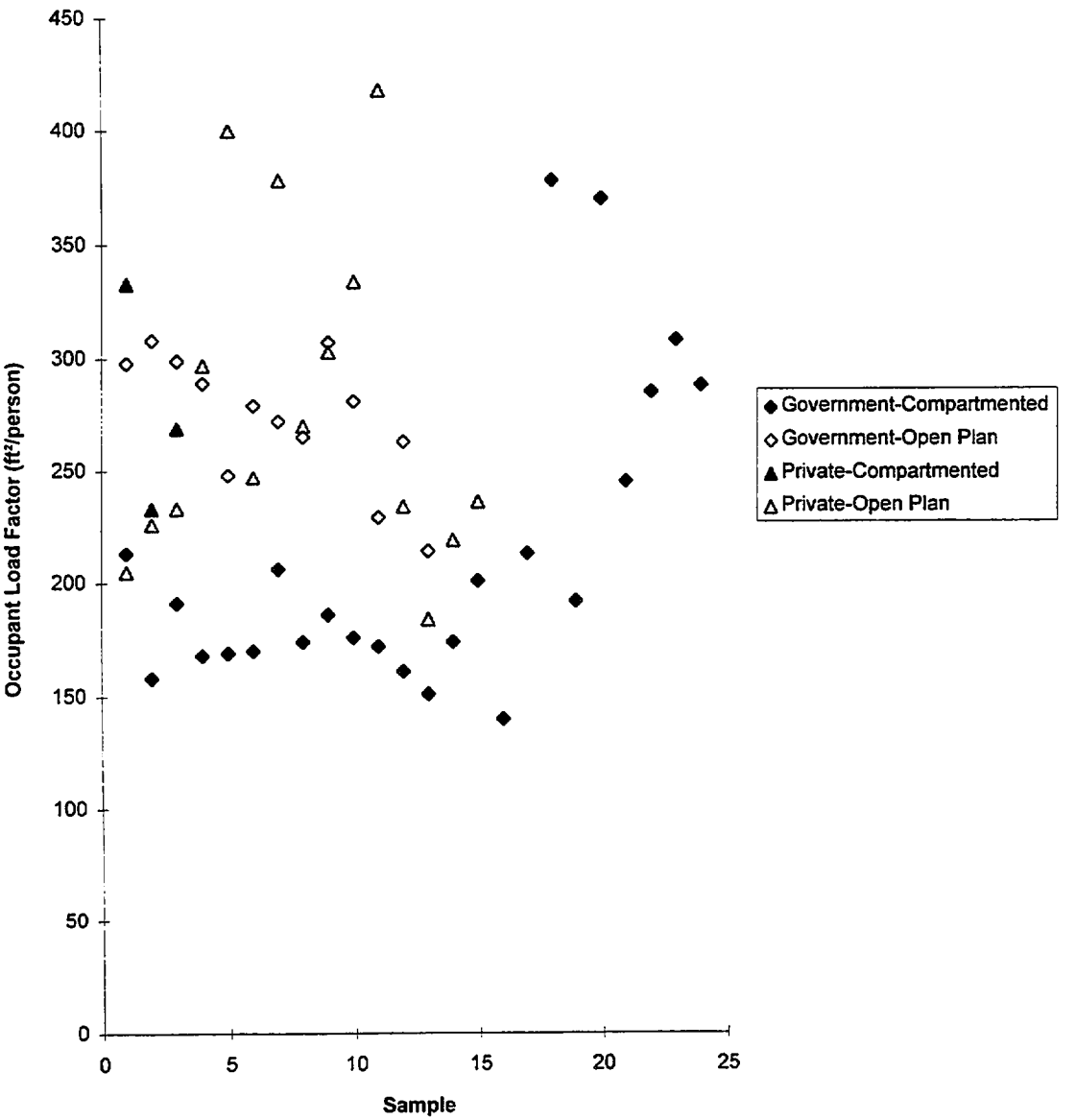
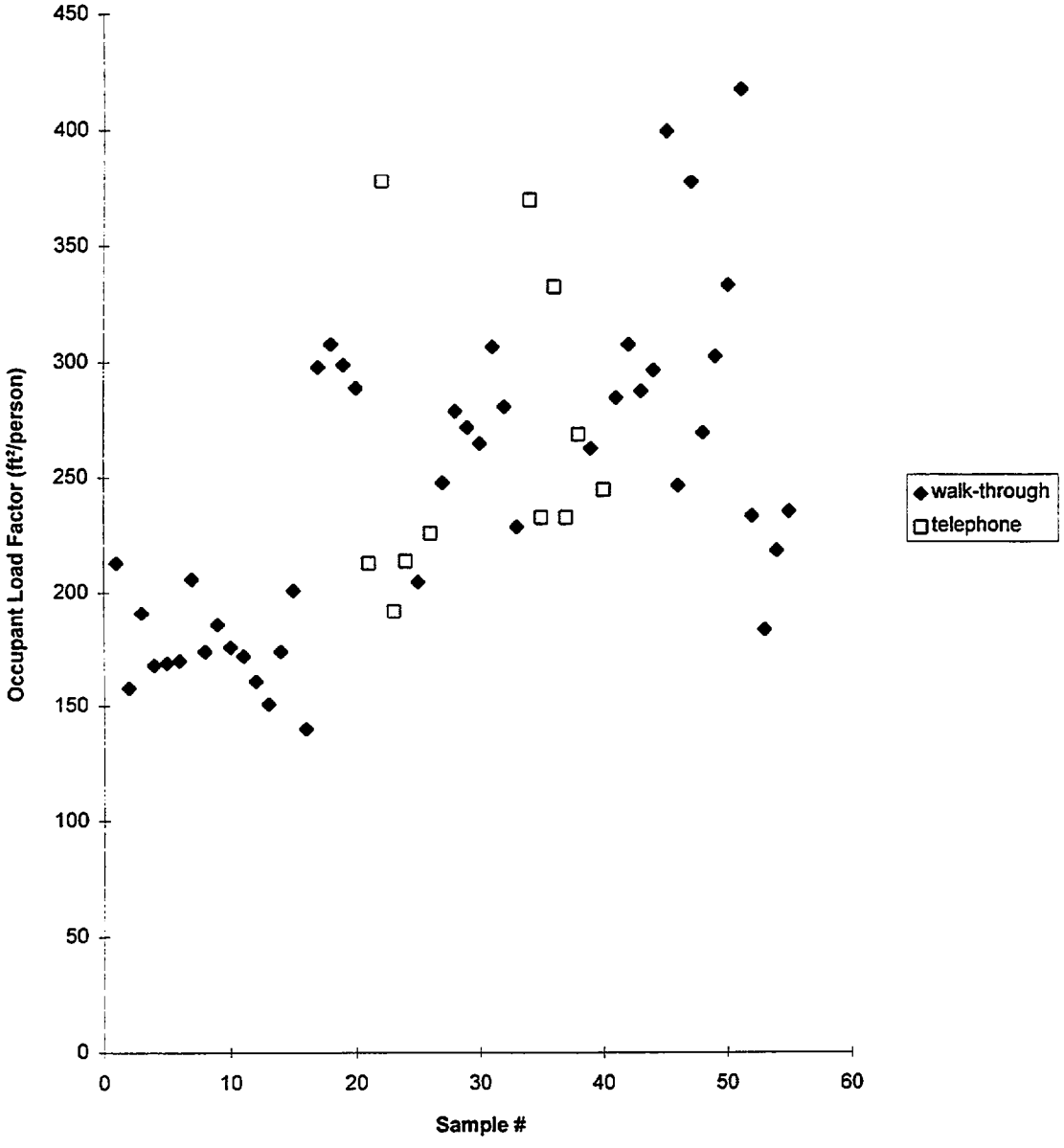


Figure 6. Comparison of Occupant Load Factors Determined by Walk-through and Telephone Survey Methods



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The development of survey methods for determining the occupant load in office buildings (business occupancies) is described. Considerations involved in formulating the survey methods are presented. The type of data to be collected and data collection techniques are discussed. The two survey methods utilized to collect the populations counts within contemporary office buildings are a building walk-through and a telephone survey. Occupant load data obtained from the survey methods applied in 23 office buildings located in the Washington, DC area are presented. Data are presented on the magnitude and distribution of the loads. The building data is sorted according to the following groups: open plan office designs versus well-compartmented office designs, and government (federal and county) versus private sector tenants. Statistical summaries of the data are presented. Buildings that are primarily composed of open plan office designs are found to have greater occupant load factors than buildings composed of well-compartmented office designs. County government office buildings area found to be slightly greater load factors than federal government buildings. Federal government buildings have lesser occupant load factors than private office buildings. The mean occupant load factor found in the study for all buildings is 248 ft^2/person. The telephone survey technique yielded a slightly greater occupant load factor than did the building walk-through technique. However, because the two survey approaches yielded relatively similar results, both are considered to be acceptable in assessing office building occupant loads. The telephone survey requires substantially less time and effort to complete, but is dependent on building management's knowledge of the occupancy characteristics.

KEY WORDS (MAXIMUM OF 9; 28 CHARACTERS AND SPACES EACH; SEPARATE WITH SEMICOLONS; ALPHABETIC ORDER; CAPITALIZE ONLY PROPER NAMES)
chairs; computers; evaluation; fuel loads; furniture; interior furnishings; office building; office furniture; surveys

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